VMap base-level database (version 12)

Metadata:

Identification Information:
Citation:
Citation Information:
Originator: USDA Forest Service, Northern Region, Engineering, Geospatial Group
Publication Date: 04/13/2012
Publication Time: 12:00
Title:
VMap_Base
Geospatial Data Presentation Form: vector digital data
Series Information:
Publication Information:
Publication Place: Missoula, MT
Publisher: USDA Forest Service, Northern Region, Engineering, Geospatial Group
Online Linkage: https://fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5366401.zip

Larger Work Citation:
Citation Information:
Publication Date:
Title:
Series Information:
Publication Information:
Description:
Abstract:
VMap is a multi-level, existing vegetation geospatial database used to produce four primary map products; lifeform, tree canopy cover class, tree diameter, and tree dominance type. The VMap database can produce products to meet information needs at various levels of analysis according to National and Regional direction established by the Existing Vegetation Classification and Mapping Technical Guide (Brohman and Bryant, 2005) and the Region 1 Multi-level Classification, Mapping, Inventory, and Analysis System (Berglund and others, 2009). This feature class (VMap_Base) is to be used at base-levels (e.g., landscapes, projects) of analysis and contains features at least 1 acre in size. The details of vegetation classification, base-level database

development, and VMap accuracy assessment are included in a variety of documents posted on the VMap web site (http://www.fs.fed.us/r1/gis/VMapWebPage.htm).

This product was created by using an iterative and interactive process. Existing vegetation was described at multiple levels of spatial and thematic resolution.

As a first step in the vegetation classification process, each stand polygon of the landscape was described by a suite of spectral and biophysical attributes. In total, the mean value of each of thirty seven different layers of information was summarized for each polygon. All of the information was derived from various levels of remotely sensed imagery, and topographically derived grid-based data layers. To provide a consistent processing environment, all data layers were formatted to ten meter pixel dimensions. This required that some data layers were generalized from 1m to 10m, while others were refined from 30m to 10m. The spectral information used in this project is based on imagery collected in 2009, as that was the date the initial stand polygon delineation was based on.

It has since been found that a better and more efficient method for producing a Base and Mid level database is to "smooth" the segmentation on the Base level, drastically reducing the number of vertices within the database and dramatically increasing the computational efficiency of the database.

Purpose:

This dataset was produced for use at project levels of analysis and planning (in some cases additional work would be needed for site specific or project level work.

Time Period of Content:

Time Period Information:

Single Date/Time:

Calendar Date: 04/13/12

Currentness Reference:

publication date

Status:

Progress: Complete

Maintenance and Update Frequency: As needed

Spatial Domain:

Bounding Coordinates:

West Bounding Coordinate: -115.005919

East Bounding Coordinate: -112.818034

North Bounding Coordinate: 49.066577

South Bounding Coordinate: 47.158056

Keywords:

Theme:

Theme Keyword Thesaurus: satellite imagery

Theme Keyword: Landsat 7

Theme Keyword: R1-VMap

Theme Keyword: eCognition

Theme Keyword: lifeform
Theme Keyword: tree dominance type
Theme Keyword: tree canopy cover
Theme Keyword: tree size
Theme Keyword: hierarchical classification
Theme Keyword: Biology, Ecology, and Biophysical
Place:
Place Keyword: Northern Rockies
Access Constraints: This dataset is in the public domain, and the recipient may not assert any proprietary rights thereto nor represent it to anyone as other than a dataset produced by the USDA Forest Service, Northern Region.
Use Constraints:
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Hours of Service: Monday-Friday, 8am-4:30 pm (MST)
Contact Instructions:

email preferred
Native Data Set Environment:
Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 3; ESRI ArcCatalog 9.3.1.3000

Back to Top

Data Quality Information:
Positional Accuracy:
Horizontal Positional Accuracy:
Horizontal Positional Accuracy Report:
<15 meters
Quantitative Horizontal Positional Accuracy Assessment:
Horizontal Positional Accuracy Value: 15
Lineage:
Source Information:
Source Citation:
Citation Information:
Title:
Orthorectified NAIP data (imagery)
Type of Source Media: CD-ROM
Source Time Period of Content:
Time Period Information:
Single Date/Time:
Calendar Date: July & August/2009
Source Currentness Reference:
ground condition
Source Citation Abbreviation:
summer imagery
Source Contribution:
These are the four channel NAIP image data.
Source Information:
Source Citation:
Citation Information:
Title:
Orthorectified path level TM data (imagery)
Type of Source Media: CD-ROM
Source Time Period of Content:
Time Period Information:
Single Date/Time:
Calendar Date: August & September/2009
Source Currentness Reference:
ground condition
Source Citation Abbreviation:
summer imagery
Source Contribution:
These are the six channel TM image data that have been calibrated to exo-atmospheric reflectance to account for between scene variation in sun angle and solar elevation. These data provided the base imagery for the image segmentation, vegetation indices, and Kauth-Thomas

Tassel-Cap transformations. This was the "peak greenness" imagery, upon which, the change detection was based.

Source Information:

Source Citation:

Citation Information:

Title:

Kauth-Thomas Tassel-Cap (TC) Transformations

Source Citation Abbreviation:

brightness, greenness, wetness

Source Contribution:

The TC is a linear transformation of the reflectance calculated TM data that rotates the data structure such that the majority of the information contained in the 6 bands will occupy 3 dimensions that are directly related to the on-the-ground physical scene characteristics. These dimensions define planes of soils (brightness), vegetation (greenness), and a transitional zone that relates to canopy and soil moisture (wetness). These three dimensions capture 97%+ of the data variation in the 6 TM bands and can enable the discernment of key forest attributes (i.e., species, age, and structure).

Source Information:

Source Citation:

Citation Information:

Title:

Normalized Difference Vegetation Index

Source Citation Abbreviation:

NDVI

Source Contribution:

The Normalized Difference Vegetation Index (NDVI) is calculated as the normalized difference between the NIR and the Red bands (NIR - R)/(NIR + R). The NDVI is probably the most widely used vegetation index and has been shown to be related to a number of different biomass variables. Simple vegetation indices such as NDVI, however, provide an inadequate representation of complex vegetation cover as they are related only to the total amount of above-ground green leaf biomass, and give no indication of the types of vegetation present. Vegetated areas will generally yield a higher NDVI value than rock, which will have values greater than that of clouds, snow, and water. The 5meter NAIP imagery was used for the NDVI where applicable. In other cases, NDVI was calculated for the Landsat TM imagery was used.

Source Information:

Source Citation:

Citation Information:

Title:

Solar-radiation aspect index

Source Citation Abbreviation:

TRASP

Source Contribution:

TRASP was used as a biophysical predictor to create a Whitebark pine probability surface for input into eCognition for the Gallatin NF portion of the VMap and also for some of the non-forest classes (see Random Forest.) The circular aspect variable is transformed to a

radiation index (TRASP.) This transformation assigns a value of zero to land oriented in a north-northeast direction, (typically the coolest and wettest orientation), and a value of one on the hotter, dryer south-southwesterly slopes. The result is a continuous variable between 0 - 1 (Robert and Cooper 1989).TRASP=(1 - cos((pi / 180)(aspect - 30)))/2

Source Information:

Source Citation:

Citation Information:

Title:

Compound Topographic Index

Source Citation Abbreviation:

CTI

Source Contribution:

The Compound Topographic Index (CTI) was used as a biophysical predictor to create a Whitebark pine probability surface for input into eCognition for the Gallatin NF portion of the VMap and also for some of the non-forest classes (see Random Forest.) CTI is a steady state wetness index. The CTI is a function of both the slope and the upstream contributing area per unit width orthigonal to the flow direction. CTI was desigined for hillslope catenas. Accumulation numbers in flat areas will be very large and CTI will not be a relevant variable. CTI is highly correlated with several soil attributes such as horizon depth(r=0.55), silt percentage(r=0.61), organic matter content(r=0.57), and phosphorus(r=0.53) (Moore et al. 1993).The implementation of CTI can be shown as: CTI = ln (As / (tan (beta)) where As = Area Value calculated as(flow accumulation + 1) * (pixel area in m2)and beta is the slope expressed in radians. The ArcInfo approach to calculating Flow Direction uses the D8 algorithm producing very unrealistic results. Several other methods are available for calculating flow directions. One of the more robust approaches is the D infinity algorithm (Tarboton 1997). There is a freeware download and documentation for TARDEM http://www.engineering.usu.edu/dtarb/ or TAUDEM http://moose.cee.usu.edu/taudem/taudem.html. The derivative of the FLOWDIRECTION calculation from either of these two programs can be used in the CTI AML or you can calculate FLOWDIRECTION in GRID.

Source Information:

Source Citation:

Citation Information:

Title:

10m Digital Elevation Model

Type of Source Media: 10m NED

Source Citation Abbreviation:

DEM

Source Contribution:

This layer contains the elevation information for each sub-path model. Illumination, slope and aspect were derived from the DEM.

Source Information:

Source Citation:

Citation Information:

Title:

Solar Radiation Index

Source Citation Abbreviation:

Solar Radiation

Source Contribution:

Derived from the 10 meter DEM using ArcGISs Spatial Analyst function. The raster created is the global radiation or total amount of incoming solar insolation (direct and diffuse) calculated for each location of the input DEM for one year. The output has unit watt hours per square meter (WH/m2). This surface was used as a biophysical predictor to create a Whitebark pine probability surface for input into eCognition for the Gallatin NF portion of the VMap and also for some of the non-forest classes (see Random Forest).

Source Information:

Source Citation:

Citation Information:

Title:

Random Forest Predictions

Source Citation Abbreviation:

Random Forest

Source Contribution:

In machine learning, a random forest is a classifier that consists of many decision trees and outputs the class that is the mode of the classes output by individual trees. The algorithm for inducing a random forest was developed by Leo Breiman and Adele Cutler, and "Random Forests" is their trademark. The term came from random decision forests that was first proposed by Tin Kam Ho of Bell Labs in 1995. The method combines Breiman's "bagging" idea and Ho's "random subspace method" to construct a collection of decision trees with controlled variations. The Random Forests classifier is part of the open source statistical package R. The USDA Remote Sensing Applications Center created a CartTools Pythogn program script (contact Bonnie Ruefenacht for the latest version of this script 801-975-3828) which accesses Rs Random Forest to create prediction surfaces. This script was used to create additional non-forest class predictions. The Mid-level non-forest classes predicted with Random Forests include grass-bunch, grass-single-stem; the litter classes litter>90%, litter 60-89.9%, litter < 60%; and the xeric-shrub canopy classes xeric shrub10-24.9%, and xeric shrub > 25%.

Source Information:

Source Citation:

Citation Information:

Title:

Generalized Additive Model Prediction

Source Citation Abbreviation:

GAM

Source Contribution:

In statistics, the generalized additive model (or GAM) is a statistical model developed by Trevor Hastie and Rob Tibshirani for blending properties of generalized linear models with additive models. This surface was used as a biophysical predictor to create a Whitebark pine probability surface for input into eCognition for the Gallatin NF portion of the VMap. The Whitebark probability surface was created

using the statistical package R version 2.72 with a General Additive Model (GAM).

Source Information:

Source Citation:

Citation Information:

Title:

Combined Slope and Aspect

Source Citation Abbreviation:

EWSLP/NSSLP

Source Contribution:

These layers are transformations of the DEM derivatives of aspect and percent slope that combines the information into single files for east/west (ewslp) and north/south (nsslp), respectively. These data have had a zonal majority calculated based on the z-grid for each sub-path model so that there is a unique value retained for each image object.

Source Information:

Source Citation:

Citation Information:

Title:

Texture image bands

Source Citation Abbreviation:

Texture

Source Contribution:

A series of calculations of texture were created from the color infrared NAIP imagery and used in the eCognition segmentation and map classification. Texture calculates a variance (minimum, mean) from an adaptive window around each pixel as its measure of texture. The resulting texture image or band is a composite of minimum variance values calculated for each pixel. Two sets of three banded texture images were created using these focal windows and parameters: The first three banded image was created from 1m NAIP using a minimum variance and focal windows of (3x3), (5X5), and (9X9), then resampled back to 5meters; the second three banded texture image was created from 5m NAIP using a mean variance and focal windows of (3X3), (5X5) and (9x9).

Source Information:

Source Citation:

Citation Information:

Title:

Model Boundary Data

Source Citation Abbreviation:

VMap model units

Source Contribution:

VMap models for processing are based on general ecological or management units. They are restricted in size for better mapping precision and also to keep within the size limit restrictions of eCognition software.

Source Information:

Source Citation:

Citation Information:

Title:
eCognition image object derived features
Source Citation Abbreviation:
BRIGHTNESS, MAX DIFF., RATIO, MIN, MAX, Standard Deviation
Source Contribution:
Through the segmentation process, eCognition calculates a number of transformations and derivatives on the input data layers. For each image object a mean and standard deviation, of the values of the pixels contained within the boundaries that image object, is calculated for each input data layer. There are also three (3) eCognition features that are calculated on a subset of the input data layers, in this case the six (6) (CH 1-5, 7) channels of the "peak greenness" TM scene and three (3) (CH 1-3) of the color infrared NAIP imagery. The first feature is termed "BRIGHTNESS", which is the sum of the mean values of those six (6) layers divided by their quantity computed for an image object. The second feature is "Maximim Difference" (MAX DIFF.) , which is the sum of the mean values of those six (6) layers minus (-) the derived BRIGHTNESS value.
Source Information:
Source Citation:
Citation Information:
Title:
Reference Data
Source Citation Abbreviation:
samples
Source Contribution:
This is the photogrammetrically interepreted and ground survey based "ground truth" data employed to model the classification membership functions and to drive the Nearest Neighbor analysis.
Process Step:
Process Description:
The path-level LandSAT 5 TM data were ortho-rectified to the 1 meter color infrared NAIP imagery 2009 using the Ortho-Rectification Module and the Landsat orbit model in ERDAS Imagine 9.2 as well as 10 meter digital elevation models. A minimum of at least 50 ground control points (GCP) throughout each of the unrectified images. Actual rectification involved the Cubic convolution algorithm and a 30m pixel size. The resulting Root Mean Square (RMS) error was less than one pixel or 30 m.
Process Contact:
Contact Information:
Contact Person Primary:
Process Step:
Process Description:
Path-level data subset to 13 map area regions based on the dissolved boundaries. Resample the 30m path level TM data to 5m resolution using ERDAS Imagine Cubic Convolution resampling technique.
Process Step:
Process Description:
Calculate minimum and mean texture images from NAIP imagery for each sub-model.

Process Step:

Process Description:

Create an eCognition "project" using the source data layers. Load the 12 TM layers, 12 tassel cap transformations and derivatives for the fall Landsat scenes, 12 Principal Component analysis 6 texture image derivatives the DEM, pnv layer, NDVI image, subpath model mask, illumination mask, and the aspect/slope combination layer.

Process Step:

Process Description:

Course level multiresolution segmentation using color infrared 5 meter NAIP imagery and texture band in eCognition software. Multiresolution segmentation is essentially a heuristic optimization procedure, which locally minimizes the average heterogeneity of image objects for a given resolution over the whole scene. Multiresolution segmentation is a method of generating image objects. It produces highly homogeneous segments in any chosen resolution, fitting your purpose. The resulting image segmentation, whose individual elements are referred to as image objects, can be universally applied to almost all data types. The image objects themselves, contain feature information based on the values of the pixels contained within the borders of each image object. These image object values are then used in the classification process, either through the use of fuzzy logic based membership functions or a Nearest neighbor analysis.

Process Step:

Process Description:

Sample data for each class in the classification schema is then loaded, or digitized, into the eCognition project. eCognition will then return a histogram for each feature and each sample base, which displays the spectral distribution of the samples over the range of the data feature chosen.

Process Step:

Process Description:

Compute a hierearchical classification based on fuzzy membership values calculated using the image object values computed through the multiresolution segmentation. The classification scheme first divides out water from non-water; then vegetated from non-vegetated; tree from herbaceous and shrub; shrub from herbaceous; 4 tree canopy cover classes from the tree dominated lifeform; 4 tree size classes from the tree dominated lifeform (using Nearest Neighbor analysis); and 8-12 dominance types (using a Nearest Neighbor analysis).

Process Step:

Process Description:

Compute classification of the Dry Grass type into two grass types (Bunch Grass and Single Stem Grass) using Random Forest alogrithm with field sample data and NAIP, Landsat, and Topographic variables.

Process Step:

Process Description:

Compute classification of the Dry Shrub type into two canopy cover classes using Random Forest alogrithm with field sample data and NAIP, Landsat, and Topographic variables.

Process Step:

Process Description:

Compute classification of Grass and Shrub lifeform types into two ground litter cover classes using Random Forest alogrithm with field sample data and NAIP, Landsat, and Topographic variables.

Process Step:

Process Description:

Final forest base level database was created by combining the 13 map area databases together and two map area databases from the 2009 Vmap m2901 and m2902 datasets.

Process Step:

Process Description:

Dissolved versions of the forest wide base level database were created for lifeform, tree canopy cover, tree diameter, and tree dominance type. A dissolve of tree canopy cover, tree diameter, tree dominance type combined was also created.

Process Step:

Process Description:

An accuracy assessment was provided for the four primary map products to quantify accuracy following four distinct lines of analytical logic. VMap accuracy assessment data are those polygons associated with the Forest Inventory Analysis (FIA) plot data. Summaries of the FIA plot data provide a means to achieve the most reliable dominance type and size determinations for each assessment reference polygon and can assist to some degree with canopy cover. The VMap accuracy assessment includes an area-weighted error matrix, which is based on the aerial extent of each class. The nature of errors in the classified map can, thus, be derived from the error matrix. A relatively recent innovation in accuracy assessment is the use of fuzzy sets for accuracy assessments. Fuzzy logic is designed to handle ambiguity and, therefore, constitutes the basis for part of the VMap accuracy assessment. Instead of assessing a site as correct/incorrect as in a traditional assessment, an assessment using fuzzy sets can rate a site as absolutely wrong, reasonable or acceptable match, good match, or absolutely right. The resulting accuracy assessment can then rate the seriousness of errors as well as absolute correctness/incorrectness. For these reasons, the VMap accuracy assessment includes a fuzzy set-based error matrix and an area-weighted fuzzy set-based error matrix.

Process Step:

Process Description:

Metadata imported.

Source Used Citation Abbreviation:

C:\DOCUME~1\cfisher\LOCALS~1\Temp\xmlD.tmp

Process Date: 20110404

Process Time: 09170300

Process Step:

Process Description:

Metadata imported.

Source Used Citation Abbreviation:

C:\DOCUME~1\hweldon\LOCALS~1\Temp\xml90A2.tmp

Process Date: 20120329

Process Time: 15203600

Process Step:

Process Description:

Metadata imported.
Source Used Citation Abbreviation:
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Process Date: 20120412
Process Time: 12545500
Process Step:
Process Description:
Metadata imported.
Source Used Citation Abbreviation:
C:\DOCUME~1\hweldon\LOCALS~1\Temp\xml3025.tmp
Process Date: 20120413
Process Time: 09075400

Back to Top

Spatial Data Organization Information:
Direct Spatial Reference Method: Vector
Point and Vector Object Information:

Back to Top

Spatial Reference Information:
Horizontal Coordinate System Definition:
Planar:
Planar Coordinate Information:
Planar Coordinate Encoding Method: coordinate pair
Coordinate Representation:
Abscissa Resolution: 0.000100
Ordinate Resolution: 0.000100
Planar Distance Units: meters
Geodetic Model:
Horizontal Datum Name: North American Datum of 1983
Ellipsoid Name: Geodetic Reference System 80
Semi-major Axis: 6378137.000000
Denominator of Flattening Ratio: 298.257222
Vertical Coordinate System Definition:
Altitude System Definition:
Altitude Resolution: 0.000100
Altitude Encoding Method: Explicit elevation coordinate included with horizontal coordinates

Back to Top

Entity and Attribute Information:
Detailed Description:
Entity Type:
Entity Type Label: VMap_Base
Attribute:
Attribute Label: OBJECTID
Attribute Definition:
Internal ESRI number
Attribute Definition Source:

ESRI
Attribute Domain Values:
Unrepresentable Domain:
Sequential unique whole numbers that are automatically generated.
Attribute:
Attribute Label: SHAPE
Attribute Definition:
Internal ESRI number
Attribute Definition Source:
ESRI
Attribute Domain Values:
Unrepresentable Domain:
Coordinates defining the features.
Attribute:
Attribute Label: FOREST_ID
Attribute Definition:
Polygon unique identifier
Attribute:
Attribute Label: ACRES
Attribute Definition:
Area of the polygon in acres
Attribute:
Attribute Label: LIFEFORM
Attribute Definition:

Enumerated_Domain 3100 HERB - Herbaceous
Enumerated_Domain 3300 SHRUB - Shrubland
Enumerated_Domain 4000 TREE - Tree
Enumerated_Domain 5000 WATER - Water
Enumerated_Domain 7000 SPVEG - Sparsely Vegetated
Attribute:
Attribute Label: DOM_MID_40
Attribute Definition:

Enumerated_Domain 3100 HERB - Herbaceous
Enumerated_Domain 3300 SHRUB - Shrub
Enumerated_Domain 5000 WATER - Water
Enumerated_Domain 7000 SPVEG - Sparsely vegetated
Enumerated_Domain 8015 MX-PIPO - Ponderosa pine dominated (>40% relative cover)
Enumerated_Domain 8025 MX-PSME - Douglas fir dominated (>40% relative cover)
Enumerated_Domain 8055 MX-PICO - Lodgepole pine dominated (>40% relative cover)
Enumerated_Domain 8065 MX-ABLA - Subalpine fir dominated (>40% relative cover)
Enumerated_Domain 8075 MX-PIEN - Englemann spruce dominated (>40% relative cover)
Enumerated_Domain 8125 MX-PIAL - Whitebark pine dominated (>40% relative cover)
Enumerated_Domain 8155 MX-PIFL2 - Limber pine dominated (>40% relative

```
cover)
Enumerated_Domain  8165 MX-POPUL - Cottonwood dominated (>40% relative
cover)
Enumerated_Domain  8175 MX-POTR5 - Aspen dominated (>40% relative
cover)
Enumerated_Domain  8185 MX-JUNIP - Juniper dominated (>40% relative
cover)
Enumerated_Domain  8400 IMIX - Shade-intolerant conifer mix (no single
species >40% relative cover)
Enumerated_Domain  8500 TMIX - Shade-tolerant conifer mix (no single
species >40% relative cover)
Enumerated_Domain  8600 HMIX - Hardwood mix (no single species >40%
relative cover)
```

Attribute:
Attribute Label: DOM_MID_60
Attribute Definition:

```
Enumerated_Domain  3100 HERB - Herbaceous
Enumerated_Domain  3300 SHRUB - Shrub
Enumerated_Domain  5000 WATER - Water
Enumerated_Domain  7000 SPVEG - Sparsely vegetated
Enumerated_Domain  8010 PIPO - Ponderosa pine dominated (>60% relative
cover)
Enumerated_Domain  8020 PSME - Douglas fir dominated (>60% relative
cover)
Enumerated_Domain  8050 PICO - Lodgepole pine dominated (>60% relative
cover)
Enumerated_Domain  8060 ABLA - Subalpine fir dominated (>60% relative
cover)
Enumerated_Domain  8070 PIEN - Englemann spruce dominated (>60%
relative cover)
Enumerated_Domain  8120 PIAL - Whitebark pine dominated (>60% relative
cover)
Enumerated_Domain  8150 PIFL2 - Limber pine dominated (>60% relative
cover)
Enumerated_Domain  8160 POPUL - Cottonwood dominated (>60% relative
cover)
Enumerated_Domain  8170 POTR5 - Aspen dominated (>60% relative cover)
Enumerated_Domain  8180 JUNIP - Juniper dominated (>60% relative cover)
Enumerated_Domain  8400 IMIX - Shade-intolerant conifer mix (no single
species >60% relative cover)
Enumerated_Domain  8500 TMIX - Shade-tolerant conifer mix (no single
species >60% relative cover)
Enumerated_Domain  8600 HMIX - Hardwood mix (no single species >60%
relative cover)
```

Attribute:
Attribute Label: DOM_GRP_6040
Attribute Definition:

```
Enumerated_Domain  3100 HERB - Herbaceous
Enumerated_Domain  3300 SHRUB - Shrub
Enumerated_Domain  5000 WATER - Water
Enumerated_Domain  7000 SPVEG - Sparsely vegetated
```

Enumerated_Domain 8010 PIPO - Ponderosa pine dominated (>60% relative cover)
Enumerated_Domain 8013 PIPO-IMIX - Ponderosa pine intolerant conifer mix (>40% relative cover)
Enumerated_Domain 8020 PSME - Douglas fir dominated (>60% relative cover)
Enumerated_Domain 8023 PSME-IMIX - Douglas fir intolerant conifer mix (>40% relative cover)
Enumerated_Domain 8050 PICO - Lodgepole pine dominated (>60% relative cover)
Enumerated_Domain 8053 PICO-IMIX - Lodgepole pine intolerant conifer mix (>40% relative cover)
Enumerated_Domain 8054 PICO-TMIX - Lodgepole pine tolerant conifer mix (>40% relative cover)
Enumerated_Domain 8060 ABLA - Subalpine fir dominated (>60% relative cover)
Enumerated_Domain 8064 ABLA-TMIX - Subalpine fir tolerant conifer mix (>40% relative cover)
Enumerated_Domain 8070 PIEN - Englemann spruce dominated (>60% relative cover)
Enumerated_Domain 8074 PIEN-TMIX - Englemann spruce tolerant conifer mix (>40% relative cover)
Enumerated_Domain 8120 PIAL - Whitebark pine dominated (>60% relative cover)
Enumerated_Domain 8123 PIAL-IMIX - Whitebark pine intolerant conifer mix (>40% relative cover)
Enumerated_Domain 8150 PIFL2 - Limber pine dominated (>60% relative cover)
Enumerated_Domain 8153 PIFL2-IMIX - Limber pine intolerant conifer mix (>40% relative cover)
Enumerated_Domain 8160 POPUL - Cottonwood dominated (>60% relative cover)
Enumerated_Domain 8170 POTR5 - Aspen dominated (>60% relative cover)
Enumerated_Domain 8180 JUNIP - Juniper dominated (>60% relative cover)
Enumerated_Domain 8183 JUNIP-IMIX - Juniper intolerant conifer mix (>40% relative cover)
Enumerated_Domain 8400 IMIX - Shade-intolerant conifer mix (no single species >60% relative cover)
Enumerated_Domain 8500 TMIX - Shade-tolerant conifer mix (no single species >60% relative cover)
Enumerated_Domain 8600 HMIX - Hardwood mix (no single species >60% relative cover)

Attribute:
Attribute Label: TREECANOPY
Attribute Definition:

Enumerated_Domain 4001 CTR 10-24.9% - CTR 10-24.9%
Enumerated_Domain 4002 CTR 25-39.9% - CTR 25-39.9%
Enumerated_Domain 4003 CTR 40-59.9% - CTR 40-59.9%
Enumerated_Domain 4004 CTR >= 60% - CTR > 60%
Enumerated_Domain 3100 HERB - Herbaceous
Enumerated_Domain 3300 SHRUB - Shrub
Enumerated_Domain 5000 WATER - Water
Enumerated_Domain 7000 SPVEG - Sparsely vegetated

Enumerated_Domain 8600 TREE-DECID - Deciduous Tree
Attribute:
Attribute Label: TREESIZE
Attribute Definition:

Enumerated_Domain 4100 DBH 0-4.9" - Basal area weighted average diameter 0-4.9"
Enumerated_Domain 4200 DBH 5-9.9" - Basal area weighted average diameter 5-9.9"
Enumerated_Domain 4300 DBH 10-14.9" - Basal area weighted average diameter 10-14.9"
Enumerated_Domain 4400 DBH >= 15" - Basal area weighted average diameter > 15"
Enumerated_Domain 3100 HERB - Herbaceous
Enumerated_Domain 3300 SHRUB - Shrub
Enumerated_Domain 5000 WATER - Water
Enumerated_Domain 7000 SPVEG - Sparsely vegetated
Enumerated_Domain 8600 TREE-DECID - Deciduous Tree
Attribute:
Attribute Label: ELEV
Attribute Definition:
Average elevation of the polygon in meters
Attribute:
Attribute Label: ASP_CLS
Attribute Definition:

Enumerated_Domain 9 - Flat (slope < 10%)
Enumerated_Domain 1 - North (338-360 & 0-22 degrees)
Enumerated_Domain 2 - Northeast (23-68 degrees)
Enumerated_Domain 3 - East (68-112 degrees)
Enumerated_Domain 4 - Southeast (113-157 degrees)
Enumerated_Domain 5 - South (158-202 degrees)
Enumerated_Domain 6 - Southwest (203-247 degrees)
Enumerated_Domain 7 - West (248-292 degrees)
Enumerated_Domain 8 - Northwest (293-337 degrees)
Attribute:
Attribute Label: SLOPE
Attribute Definition:
Average percent slope of the polygon
Attribute:
Attribute Label: SHAPE_Length
Attribute Definition:
Length of feature in internal units.
Attribute Definition Source:
ESRI
Attribute Domain Values:
Unrepresentable Domain:
Positive real numbers that are automatically generated.
Attribute:
Attribute Label: SHAPE_Area
Attribute Definition:

Area of feature in internal units squared.

Attribute Definition Source:

ESRI

Attribute Domain Values:

Unrepresentable Domain:

Positive real numbers that are automatically generated.

Back to Top

Distribution Information:

Distributor:

Contact Information:

Contact Person Primary:

Contact Person: Jim Barber

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Resource Description: R1-VMap Dataset

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Back to Top

Metadata Reference Information:

Metadata Date: 20120413

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email preferred
Metadata Standard Name: FGDC Content Standards for Digital Geospatial Metadata
Metadata Standard Version: FGDC-STD-001-1998
Metadata Time Convention: local time
Metadata Extensions:
Online Linkage: http://www.esri.com/metadata/esriprof80.html
Profile Name: ESRI Metadata Profile
Metadata Extensions:
Online Linkage: http://www.esri.com/metadata/esriprof80.html
Profile Name: ESRI Metadata Profile
Metadata Extensions:
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Metadata Extensions:
Online Linkage: http://www.esri.com/metadata/esriprof80.html
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Back to Top